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Complete Research

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Abstract

The acquisition of packaged software is gaining importance. The most crucial task during enterprise software acquisition is the selection of a software product and accompanying license model. The license model (or tariff) chosen severely impacts the total costs of the purchased solution over its life cycle and, thus, should be evaluated carefully. Existing literature from different decision contexts suggests that tariff choices are often times biased, leading to non-optimal decisions and costs. With this paper, we explore whether certain tariff-choice preferences and biases exist in the context of software acquisition. Hence, we analyse data from a multiple case study with five cases in four large organisations and base our findings on interviews with 19 decision-makers from IT, business, and procurement. The insights we gain from six interviewees especially point to the existence of both flat rate and pay-per-use biases in organizational contexts. Additionally, we find initial support for the relevance of prospect- theoretical reference points as a cause for tariff-choice biases. Therefore, our research can help practitioners to optimize their tariff choices in organizational buying situations and we present new avenues for future research.

Keywords: Tariff choice, flat rate bias, pay-per-use bias, prospect theory, software acquisition, business-to-business

1 Introduction

The acquisition of packaged software is gaining in importance. According to market research, packaged software spending by organizations will increase and hit more than 360 billion USD in 2013 (Melgarejo, 2012). 63 % of organizations want to buy or use packaged software in the future (Roe, 2011) and tend to prefer standardized packaged software when choosing new software solutions (Light, 2005). During the selection phase for new solutions, a complex evaluation takes place, during which many criteria are considered (Jadhav and Sonar, 2009). A crucial aspect that decision makers within organizations need to take into account is which license model and which pricing options to adopt (Poon and Yu, 2010; Wybo et al., 2009). The license model or tariff that is chosen significantly determines the total cost of ownership for the software during its life cycle (Bibi et al., 2012). Hence, choosing the optimal software and tariffs has severe consequences (Lin and Silva, 2005).

Much research has recently discussed how decision makers can be subject to certain decision biases that prevent purely rational or optimal decisions (e.g., Duxbury, 2012; Hilbert, 2012). However, making competent, informed and rational choices in the context of IT greatly impacts the whole organization (Benlian, 2011). Tariff choices have been predominantly explored in end-user decision

situations, where tariff-choice biases have been found to occur in a variance of settings (Herweg, 2013; Kridel et al., 1993; Lambrecht and Skiera, 2006). Often times, end-users prefer flat rate tariffs, although pay-per-use tariffs would be cheaper (Krämer and Wiewiorra, 2012), which literature refers to as flat rate bias. On the other hand, some findings point to pay-per-use biases, which means that users choose pay-per-use tariffs when a flat rate tariff would be optimal (Lambrecht and Skiera, 2006).

Regarding organizational decision-making, results are scarce. In the only study we are aware of, Backhaus et al. (2011) find that a flat rate bias is present for phone tariff choices in organizations. However, these decisions still closely resemble decisions made by end-users as they do not impact whole organizations but rather users or user groups. Analysing tariff-choice preferences in large organizational decision processes promises interesting new insights compared to consumer choices, as decisions and usage are decoupled from each other and tariff choices are made in complex group situations (Backhaus et al., 2011). With this paper, we strive to explore how organizational tariff-choice decisions are made and whether tariff-choice biases are present for organization-wide decisions. Software acquisition (SA) decisions are relevant instances of these decision types, since many stakeholders are engaged in a complex process with huge impacts (Verville and Halingten, 2003b). More precisely, we aim to contribute in the following ways:

(1) We discuss how tariff choices are made during organizational decision making and analyse the role of biases.
(2) We explore which effects result in tariff preferences during organizational software acquisition decision making and which differences are in place with respect to consumer choices.
(3) We propose a new approach for integrating the existing findings on flat rate and pay-per-use biases.

In order to do so, we followed a multiple case study approach with five cases in four large organizations. We interviewed 19 executives from business, IT, and procurement who were involved in software acquisition decisions. Our findings can help to understand organizational tariff-choice decision making and support decision makers with considering all relevant aspects more deeply in order to come to informed decisions.

The remainder of the paper is structured as follows: In the next section, we integrate the existing findings on tariff-choice biases and discuss the context of software acquisition that our study is situated in. In section 3, we describe our research approach before we present the results in section 4. In section 5, we discuss the key findings of our study, and we conclude the paper in section 6, where we also mention the limitations of this study and present avenues for future work.

2 Theoretical Background

In this section, we discuss strategic decision processes and tariff-choice biases first, as these topics constitute the theoretical foundation of our study. Second, in section 2.3, we give some contextual information about related work and main topics in software acquisition literature.

2.1 Strategic decision processes

Strategic decision making is “the process by which top management makes its most fundamental decisions” (Das and Teng, 1990, p. 758). Strategic decisions lack structure, and they are associated with novelty, complexity, and open-endedness (Mintzberg et al., 1976). Moreover, strategic decision processes are affected by human cognitive limitations (Schwenk, 1985). As the complexity of business environments has been increasing continuously in the last decades, and decision environments are ambiguous and unpredictable, decision making situations are uncertain and risky (Van Der Vyver, 2004).

Given this context, prospect theory has been developed and is widely discussed (Kahneman and Tversky, 1979). Prospect theory criticizes the assumptions of expected utility theory for decision making under risk. Expected utility theory implies that decisions are made rationally and that individuals always choose the option which maximizes their utility based on a probability distribution of outcomes. By contrast, Kahneman and Tversky (1979) argue that individuals "systematically violate this principle" in many choice problems. They tend to evaluate decision outcomes as gains or losses from some reference point. The authors label this phenomenon the reference effect. The perceived value of gains or losses that decision makers base their choices upon depends on that reference point and on the psychologically-grounded S-shaped value function (Kahneman and Tversky, 1979). This function, which is depicted in Figure 1, represents the relationship between the objectively defined gains and losses and the perceived subjective value an individual places on these gains and losses (Arkes and Blumer, 1985).

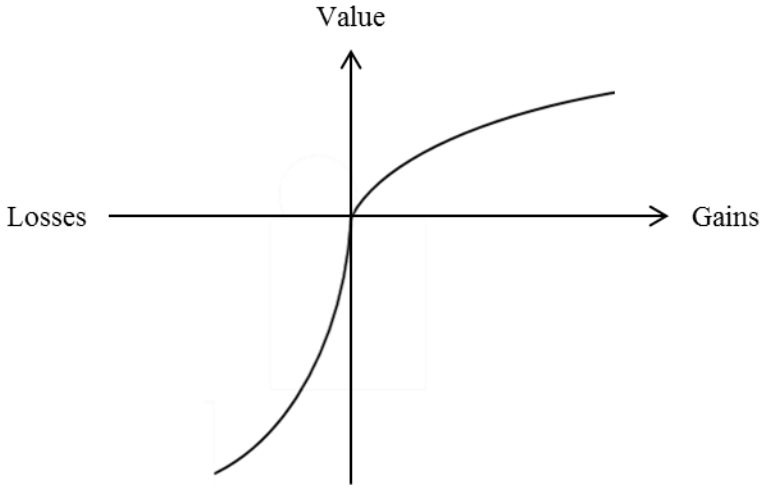

Figure 1. The value function of prospect theory (Kahneman and Tversky, 1979)

The function is based on deviations from some reference point, which also is the steepest point of the function. The function is concave for gains and convex for losses, and it is steeper for losses than for gains (Kahneman and Tversky, 1979). Hence, the characteristics of the value function imply the so called reflection effect. This effect describes that the absolute value of a marginal gain is perceived less important than the absolute value of an equivalent marginal loss, which is interpreted as loss aversion. Furthermore, Kahneman and Tversky (1979) state that individuals overweight outcomes considered certain compared to outcomes that are merely probable. This phenomenon is called the certainty effect.

Additionally, as literature shows, in many decision situations so called decision biases entice decision makers away from making optimal decisions in terms of utility maximization (Das and Teng, 1990; Haley and Stumpf, 1989). These biases are systematic decision errors and significantly impair human performance in a variety of decision making situations (Roy and Lerch, 1996). Literature purposes a wide field of these biases (Arnott, 1998). In the context of tariff choices, two different biases have been identified: the pay-per-use bias and the flat rate bias, both of which we will discuss in the following.

2.2 Tariff-choice biases

The standard assumption of rational expectations implies that consumers choose the tariff which maximizes their utility based on their future consumption frequency (Della Vigna and Malmendier, 2006). That is, on average and over time, they select the surplus-maximizing contract as they opt for the tariff with the lowest billing rate for a given amount of usage (Lambrecht and Skiera, 2006). However, considering Prospect Theory, individuals do not always act as expected utility theory

predicts. Likewise, studies show that consumers do not always choose the utility maximizing contract. Instead, they often base their choices on tariff-specific preferences and not only on the expected billing rate (Wolk and Skiera, 2010). So, these preferences influence their tariff-choices. Two kinds of preferences have been widely discussed.

First, consumers often prefer a flat rate over a pay-per-use tariff which has been dubbed the flat rate bias (Train, 1991). This bias was first observed in the 1980s in studies about households' choices among telephone services. Many studies have proven the existence of the flat rate bias since then (Lambrecht and Skiera, 2006). Kridel et al. (1993), for example, demonstrate that nearly 65 percent of participants who selected a flat rate might have saved money by choosing a pay-per-use tariff. The bias has been verified in a variety of contexts like health care tariff choices (Della Vigna and Malmendier, 2006), German railway cards (Schmale et al., 2011), all-you-can-eat buffets, online newspapers (Krämer and Wiewiorra, 2012), and internet access plans (Lambrecht and Skiera, 2006). Second, some studies found that a few consumers prefer a pay-per-use tariff over a flat rate. Analogously, this preference is called pay-per-use bias (Lambrecht and Skiera, 2006). The pay-per-use bias seems to occur less often and less regular than the flat rate bias (Wolk and Skiera, 2010).

Different motivational and cognitive explanations as causes for the existence of both the flat rate and the pay-per-use bias have been suggested and classified in four different effects: The insurance effect, the convenience effect, the taximeter effect and the over- or underestimation effect (Wolk and Skiera, 2010). For better readability, these four effects are marked in bold and causes of the effects in italic font within the rest of the text.

One aspect of the **insurance effect** is that a flat rate has an *option value*. This option value is independent of the actual usage of the service and gives consumers the option to use more at the same price (Kridel et al., 1993). Furthermore, the insurance effect implies that consumers may choose a flat rate to avoid variations in their monthly billing rate (Lambrecht and Skiera, 2006). Consumers, who *cannot predict their future consumption exactly*, often prefer a flat rate to insure against the risk of high costs in periods of higher-than-average usage (Wolk and Skiera, 2010). Especially risk averse consumers tend to do so. Surprisingly, *risk aversion* has also been proposed as a cause for the presence of the pay-per-use bias, but no empirical support has been provided for this claim so far (Lambrecht and Skiera, 2006; Train, 1991; Wolk and Skiera, 2010). Moreover, Herweg (2013) state that risk aversion cannot be the only reason for the insurance effect as the variations in billing rates in the observed business-to-consumer (B2C) setting are usually marginal compared to the total income of consumers. Risk aversion is additionally captured by reference-dependent preferences of the consumers in combination with loss aversion. When a tariff is selected, the consumer's demand is uncertain. That is why consumers form rational expectations about their invoice. This expected value can determine their reference point (Herweg, 2013). As prospect theory suggests, the perceived value of a decision outcome depends on that reference point (Kahneman and Tversky, 1979).

The **convenience effect** can lead to both the flat rate bias and the pay-per-use bias. Consumers might enjoy the convenience of not comparing various tariffs and believe that choosing among different tariffs is inconvenient or even annoying (Lambrecht and Skiera, 2006; Wolk and Skiera, 2010). Therefore, they try to *avoid the effort* for identifying alternative tariffs and calculating the numerous expected billing rates (Wolk and Skiera, 2010). Often times, consumers minimize the information costs as they choose the tariff which seems to be the "default tariff" (Lambrecht and Skiera, 2006), for example the tariff used before (*habit*) (Train, 1991). If this tariff is a flat rate, the flat rate bias occurs. If it is a pay-per-use tariff, the pay-per-use bias occurs. However, Backhaus et al. (2011) suggest that the convenience effect is irrelevant in business-to-business (B2B) settings. Since information costs are mitigated as they can be allocated across a group of users, decision makers' motivation to screen tariff information should be stronger. Additionally, it is the decision makers' core task to base decisions on economic measures and control costs.

The **taximeter effect** is supposed to be a driver of the flat rate bias (Backhaus et al., 2011; Lambrecht and Skiera, 2006). It occurs when consumers enjoy their usage more on a flat rate than on a pay-per-use tariff (Wolk and Skiera, 2010). The effect is derived from the experience of using a taxi in a foreign country: The taxi ride can be perceived as unpleasant because the running taximeter constantly visualizes the accumulated costs (Krämer and Wiewiorra, 2012). Based on mental accounting theory, which implies that consumers set up and work with mental budgets and accounts, consumers attribute the disutility of payment directly with the consumption of the good (Prelec and Loewenstein, 1998). Hence, pay-per-use tariffs decrease the joy of consumption as consumption is directly related to the costs and 'pain of paying' at the time of usage. Flat rate tariffs, on the other hand, uncouple consumption and payment. Mentally, costs are prepaid and the subsequent usage can be enjoyed as if it was free (Lambrecht and Skiera, 2006). Backhaus et al. (2011) claim the taximeter effect should be irrelevant in B2B settings too, because consumers do not account costs and therefore they do not feel the pain of paying to consumption.

Another effect that has been identified is the **(mis-)judgment effect** (also referred to as over- or underestimation effect) (Backhaus et al., 2011). Consumers suffer from over- and underestimation errors in both directions (Lambrecht and Skiera, 2006). Thereby, overestimation can result in a flat rate bias, whereas underestimation has been identified as a major cause for the pay-per-use bias (Wolk and Skiera, 2010). Nunes (2000) argues that consumers make the crucial error not to compare their expected average usage with the breakeven volume of two tariffs. Instead, they compare the subjective likelihood of using more than the breakeven volume with the subjective likelihood of using less than the breakeven volume. Eventually, consumers tend to choose a flat rate if the expected highest and lowest usage is perceived as probable and a pay-per-use tariff if it is improbable (Nunes, 2000). The misjudgment effect also appears to be relevant in B2B settings. Backhaus et al. (2011) state that due to increased uncertainty on the one hand and the group-decision effect on the other hand (mis-)judgments account for tariff-choice biases in B2B settings.

2.3 Related work on software acquisition

In IS literature, a process-oriented view on the topic of software acquisition has been predominantly adopted. This study is based on a generic software acquisition process depicted in Figure 2.

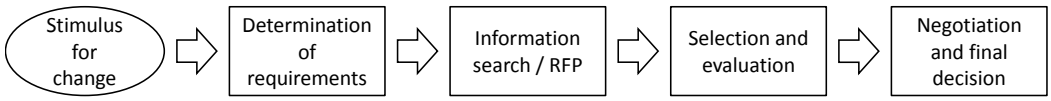

Figure 2. SA Process based on Verville and Halingten (2003b);McQueen and Teh (2000)

The software acquisition process usually starts with a stimulus for change (McQueen and Teh, 2000). Once the project is approved, requirements have to be determined (Deep et al., 2008). These requirements are used as a basis for identifying vendors that are able to fulfil these requirements (active information search (Verville and Halingten, 2003b)) or included in the request for proposals (RFP) (Goldsmith, 1994)). The possible solutions and vendors are evaluated (Chau, 1995), and a shortlist is selected (McQueen and Teh, 2000). Finally, negotiations with one or more vendors take place until a decision is made (Howcroft and Light, 2006; Palanisamy et al., 2010). In the selection and evaluation phase, as well as during negotiations, license models and pricing options play an important role (Jadhav and Sonar, 2009; Poon and Yu, 2010; Wybo et al., 2009). Software acquisition decisions are often made in teams (Bernroider and Koch, 2001) comprising IT experts/managers, business experts/managers and procurement experts (Verville and Halingten, 2003b; Yeow and Sia, 2008), but in many cases managers exert significant influence (Howcroft and Light, 2006; Verville and Halingten, 2003a) over the selection and choice of products and license models.

This study is, to the best of our knowledge, the first one bringing together the context of software acquisition and tariff-choice preferences and biases, respectively. Given the organizational enterprise-

level decisions that software acquisition decisions stand for, we are able to identify antecedents of tariff-choice biases in B2B-settings. While previous research in this area is scarce and focusses on decisions that affect users or user groups only (Backhaus et al., 2011), the goal of this study is to broaden our knowledge about the role of tariff-choice preferences in complex organizational decision making processes.

3 Research Approach

We analyze tariff-choice decisions on an organizational level based on the results of a multiple case study that we conducted with five cases from four large enterprises. Wherever possible, we aim at following the guidelines suggested by Dubé and Paré (2003). We concentrate on tariff preferences which point to tariff-choice biases (cf. also Herweg, 2013; Krämer and Wiewiorra, 2012). Although predominantly relying on preferences instead of actual tariff-choice decisions with their respective costs is not optimal (Krämer and Wiewiorra, 2012), the presence of preferences in the absence of precise usage and pricing metrics strongly indicates biases (Kling and Van Der Ploeg, 1990; Nunes, 2000).

3.1 Case study design

For the case study, we decided to apply a multiple-case design following mostly literal replication but also theoretical replication logic (Yin, 2009). We studied five software acquisition cases from four different large-scale organizations. The purchased software was associated with differing importance and impact for the respective organizations. The units of analysis are singular software acquisition decisions (Yin, 2009). For each decision we include the viewpoints of the three most important groups or departments in software acquisition projects: IT, the primary business unit initiating the acquisition, and the purchasing department (Verville and Halingten, 2003b; Yeow and Sia, 2008). Hence, by taking into account these three groups, we apply a triadic case study approach.

To enhance construct validity we used multiple sources of evidence (data triangulation) (Yin, 2009) and collected data within two waves: First, we conducted in-depth interviews with at least one member of each department. In addition, we assembled supplementary documents (company information, process descriptions, and project specific documents), which were used to corroborate results. Yet, the interviews constitute our primary data source (Walsham, 1995). In total, we carried out 17 interviews with 19 interviewees, who had on average 16 years of experience in their respective fields. The interviews lasted 67 minutes on average, were recorded (if permission was obtained, else extensive field notes were taken), and transcribed. Furthermore, informal discussions during field-site visits provided valuable insights, which were also written down in field notes, resulting in a total of 276 analyzable pages. Finally, when answers or statements were not clear, we contacted the interviewees via mail or telephone for clarification. Second, but less important in the context of this study, we had our interviewees fill out a structured questionnaire based on the initial findings from the interview data. An overview of our case firms, the investigated software acquisition projects, and involved interviewees is given in Table 1.

Case	ALPHA	BETA	GAMMA	DELTA	EPSILON
Industry	Process industry	Finance	Transport	Transport	Manufacturing
Employees	>30,000	>50,000	>100,000	>100,000	>100,000
Sales	> € 10,000 m	> € 500,000 m	> € 20,000 m	>€ 20,000 m	>€ 20,000m
Type of purchased software	Audit management	Payment transactions	Operating system and office software	Website-related systems	Human resources management software
Total duration	1 year	9 months	1 year	1 year	18 months
Total volume	> € 50,000	> € 5,000,000	> € 5,000,000	> € 5,000,000	> € 5,000,000
Current project phase	Final evaluation	Negotiation	Acquisition completed	Acquisition completed	Acquisition completed
Interviewees	3	3	5[*)]	5[*)]	4
Positions of interviewees	**P:** IT procurement agent **IT:** Information manager **B:** IT auditor (project manager)	**P:** Director IT procurement **IT:** Managing IT director **B:** Director of operations	**P:** IT Procurement manager, IT procurement agent[*)] **IT:** Head of IT, IT supplier relationship manager (SRM) **B:** Director license management	**P:** 2 IT procurement agents[*)] **IT:** 2 IT project managers **B:** Online sales manager	**P:** IT procurement manager **IT:** IT project manager, IT supplier relationship manager **B:** Director human resources

[*)] The IT procurement agent in GAMMA was also involved in DELTA. We interviewed him about both SA projects in one interview. Therefore, we have a total of 19 (not 20) interviewees.

Table 1. Descriptive Information on Cases and Case Firms

3.2 Data analysis

Based on our analysis of the literature on tariff-choice biases, we established a code book (Miles and Huberman, 1994) and assigned codes to all statements that reflected tariff-choice decisions and tariff or license model preferences. Coding was done by both authors using the software package Atlas.ti. Finally, the coding process resulted in a total of 26 different codes marking 95 statements made by our interviewees. In the last step, we analyzed all statements from the interviews that were coded and thus related to tariff-choice decisions. The complete analysis process is depicted in Figure 3. Again, the analysis of findings was done by both authors. All results were discussed and iteratively refined. In the process, all disagreements on steps or results were resolved.

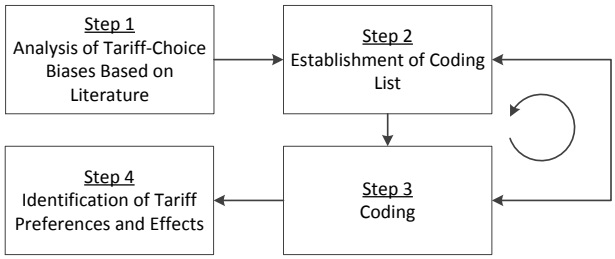

Figure 3. Overview of data analysis

The analysis of tariff-choice decisions and potential biases was not a primary goal of the original study design (Harnisch et al., 2013; Harnisch et al., 2014). Hence, we spent only a limited amount of time, both with regard to the interviews and the questionnaire, on subjects such as license models, pricing options, and tariff choices, restricting the amount of findings we are able to present in this paper. However, our findings are based on all interviews during which tariff-choice preferences were mentioned. The other interviewees were less involved and interested in tariff options, but their statements do not contradict our findings.

4 Insights on Tariff-choice Biases

Within this section, we present the initial results of our multiple case study on tariff choices. In section 4.1, we describe the five software acquisition cases and explain the price and license models they chose. In section 4.2, we go into detail and discuss the presence of tariff-choice biases or preferences that are not purely rational.

4.1 Software acquisition decisions and tariff choices

The ALPHA case was located within a firm from the process industry. The internal auditing department was in need of a new audit management software, because support for the current software had expired. A procurement project was initiated, and several supplier options were evaluated. At the time of data collection, two suitable software packages were still in the run, but a clear favourite had emerged. Both solutions offered similar license models based on the number of concurrent users that should be allowed to operate the software. Hence, tariff choices were less in focus in this case.

The case of BETA took place in a financial institution. A very heterogeneous landscape of systems and software was in use to process payment transactions across countries, subsidiaries, and types of payment. External institutional pressure in form of new regulations for handling payment transactions by the European Union was taken as an opportunity to select and buy a new and integrated software package. At the time of data collection, final negotiations were taking place. The software had already been selected, and a plan for the subsequent implementation phases had been created. The tariff choice in the BETA case was special. The acquisition team did not accept the tariffs offered by the vendor but managed to implement their own corporate pricing metric instead. This metric is based on a mixture of usage-dependant and usage-independent measures.

GAMMA and DELTA were situated in the same firm from the transport industry but represent two very different types of acquisition projects. While GAMMA was about the procurement of office and operating systems for workplaces, DELTA comprised the selection and acquisition of website-related software. For GAMMA, supplier choices were very limited and the primary efforts went into collecting internal demands and choosing contractual models, which were negotiated with the present supplier. Finally, a usage-dependant tariff based on the number of active users was selected. DELTA, on the other hand, represents a software procurement project in which multiple options were present, and final solutions were chosen in discussions with all participants. Although some interviewees explicitly stated their preference for a flat rate based tariff, only usage-dependant license models were available and chosen eventually. The metric for the web analysis software grounds on the number of page views.

In the EPSILON case, a human resources management software was procured and chosen. After setting up an evaluation project, EPSILON decided to implement a new solution by their extant ERP supplier. There was no explicit tariff for the purchased software, for there was an enterprise-wide license agreement with the ERP supplier that included their entire current and future product offers. The tariff for this license agreement was a flat rate.

4.2 Tariff-choice biases

In three out of our five cases, interviewees preferred a flat rate over a pay-per-use tariff and therefore the flat rate bias might have occurred. In the GAMMA case, the pay-per-use bias might have been present, as two interviewees stated that in general, they would prefer a pay-per-use tariff over a flat rate. Table 2 shows in which cases the choice was made between a flat rate and a pay-per-use tariff and in which cases a preference for a particular tariff could be identified.

Case	ALPHA	BETA	GAMMA	DELTA	EPSILON
Multiple tariff-options were present	☐	☐	■	☐	■
Flat rate was chosen	☐	(▣)	☐	☐	■
Pay-per-use tariff was chosen	**(■)**	(▣)	■	(■)	☐
Preference for a flat rate	■	☐	☐	■	■
Preference for a pay-per-use tariff	☐	☐	■	☐	☐

Legend: ☐ – option not available, false; ▣ – partly true, combined tariff was chosen; ■ – option available, true.
Options in brackets indicate that the tariff was not actively chosen but was the only option

Table 2. Overview of tariff choices and tariff preferences in our five cases

The two rows on the bottom of Table 2 display the presence of tariff (flat rate or pay-per-use tariff) preferences. The data stem from both qualitative statements made in the interviews, which we will discuss in more detail, and quantitative data from the questionnaire by all respondents per case. Both types of data unanimously support the preferences shown.

In the case of ALPHA no deliberate choice between usage-dependent or usage-independent tariff was made. However an interviewee stated that, generally, the procurement department would prefer fixed prices and that usage-dependent pricing models were *"bad and to be avoided"* (Procurement, ALPHA). For BETA, the chosen tariff was mandatory, based on corporate governance rules that our interviewees had to follow. In the GAMMA case, a usage-dependent tariff was selected, and a preference for such tariffs was claimed, as the following quotes illustrate:

> *„In general, we would always – not always but we tend to – prefer a variable pricing model."* (Head of IT, GAMMA)

> *"In the last years, we abandoned fixed prices more and more but move towards business-oriented pricing models for systems where it makes sense."* (IT SRM, GAMMA)

In the case of DELTA, no active choice for or against a flat rate was made. However, the interviewee of the procurement department showed a preference for a flat rate as the next quote demonstrates:

> *"If our consumption increases, we prefer a fixed price."* (Procurement, DELTA)

Case EPSILON is the only case in which a flat rate was actually selected. Two interviewees confirmed they preferred a flat rate in general (called enterprise license by their supplier), as the following quote exemplifies:

> *"I've got a preference regarding license models: If we buy software, it is my goal to get an enterprise license if possible."* (Procurement, EPSILON)

All in all, we find that in six out of 17 interviews a preference for a certain tariff is mentioned. Table 3 summarizes the causes for tariff-choice biases we identified within these interviews. We note that no interviewee from business explicitly mentioned tariff preferences. Choosing price and license models does not seem to be in their scope, as the following quote exemplifies:

> *"Choosing price and license model is not our responsibility"* (Business, GAMMA)

Bias	Flat rate preference				Pay-per-use preference	
Effect \ Interviewee	ALPHA (P)	DELTA (P)	EPSILON (IT)	EPSILON (P)	GAMMA (IT SRM)	GAMMA (IT Head)
Insurance effect	■	■	■	□	■	■
Future consumption is unknown	↑■↑	↑■↑	↑■↑	□	↓■↓	↓■↓
Risk/loss aversion	■	■	■	□	■	■
Option value	□	□	■	□	□	□
Convenience effect	□	□	■	■	□	□
Habit	□	□	□	□	□	□
Avoidance of effort	□	□	■	■	□	□
Taximeter effect	□	□	□	□	□	□
(Mis-)judgment effect	□	□	□	□	□	□

Legend: □ – not present; ■ – present; ↑ – increasing consumption expectation; ↓ – decreasing consumption expectation

Table 3. Identified causes for tariff choice biases.

4.2.1 Flat rate bias

As Table 3 shows, in three interviews during which a preference for a flat rate was claimed, the **insurance effect** seems to be the main driver for the presence of the flat rate bias.

The effect is mainly triggered by the fact that the *future consumption* is not known at the time the choice for a tariff is made, as it happened to be in all relevant cases. Also, our findings indicate that the interviewees expected increasing usage, as the following quotes demonstrate.

> *"I need to peek into the future. Perhaps, a certain growth of the number of users and the amount of data occurs. [Our supplier] might also increase prices. […] We can't really calculate it."* (IT, EPSILON)

> *"If you typically have [...] increasing usage, then we prefer, of course, to purchase all usage rights with one fixed single payment."* (Procurement, Delta)

Additionally *risk/loss aversion* seems to be a main trigger for the insurance effect and thus for the flat rate bias. It was identified in all three interviews in which the insurance effect was present as a cause for the flat rate bias.

> *"Licensing based on the number of transactions would only make sense, if a valid risk assessment was possible."* (Procurement, ALPHA)

Moreover, the *option value* of a flat rate was mentioned in one interview as a cause for the insurance effect leading to a flat rate preference, as the following quote illustrates:

> *"If the price is mostly stable and we even get innovations for the same price, everyone should be satisfied. […] Because of the flat rate, we use some products, we would not have used without it. […] That way, we can try out new products without additional license or maintenance costs."* (IT, EPSILON)

Furthermore, the **convenience effect** as a cause for the flat rate bias was present in the EPSILON case. While we did not find evidence for *habit* triggering this effect, *avoiding effort* was deemed relevant. In the EPSILON case it was put this way:

> *"It is quite an effort, if you have to determine the amount of required licenses for a software product each and every time."* (IT, EPSILON)

> *"Managing software licenses is a lot of work, that is, you invest capacity, which binds resources and finally causes costs. That is why a [flat rate] is the goal."* (Procurement, EPSILON)

These quotes show that the effort for calculating and managing pay-per-use tariffs is greater than simply paying a fixed flat rate amount per year, which results in a preference for a flat rate.

4.2.2 Pay-per-use bias

The pay-per-use bias was present in the GAMMA case (see Table 2). Both the *uncertainty about future consumption* and *risk/loss aversion* as causes of the **insurance effect** also appear to play a role for the occurrence of a pay-per-use bias (see Table 3). GAMMA is situated in an industry that is described as very volatile – sales are uncertain and might also decrease. Therefore, two interviewees we talked to preferred pay-per-use tariffs due to expected decreasing usage.

> *"We prefer variable [pay-per-use] license models, because [our] industry is not well. […] If the amount of [cargo] decreases, we pay less.*" (Head of IT, GAMMA)

> *"If we've got a lot of [cargo], the system is used more and payment is greater. If less [cargo] is there, the system is used less. […] For the usage of systems that strongly depend on the business, it sums up to a significant amount of money and pay-per-use tariffs make sense."* (IT SRM, GAMMA)

No other effects and causes of the pay-per-use preference (or: bias) were mentioned. As we can see from the quotes above, the uncertainty about further consumption and risk/loss aversion are closely related. The volatility of the industry makes predictions about future usage difficult and uncertain. Since this volatility is primarily framed as a risk, avoiding the risk of paying too much for an uncertain and possibly decreasing usage results in the preference for a pay-per-use tariff.

Overall, we did not find evidence for the **taximeter effect** and the **(mis-)judgment effect** within our cases. Still, the directionality of the uncertain future consumption points to potential over- or underestimation errors.

5 Discussion of Key Findings

It is interesting to note that we can support the findings from the literature pointing to the insurance effect as a cause of both flat rate and pay-per-use bias (Lambrecht and Skiera, 2006). The question remains as to why this effect provokes the choice of a flat rate in some cases and the choice of a pay-per-use tariff in others. As far as we are aware of, this ambiguity has not been discussed so far. One possible explanation is given by prospect theory. Keeping in mind that decision makers base their decisions on the subjective value they attribute to gains/losses in relation to a certain reference point, the reference point might be the crucial aspect.

Option 1: The decision makers' reference point is based on a pay-per-use tariff, i.e. calculated as a certain amount of usage (e.g., number of transactions, licenses, users) multiplied by the price per unit (R_0 in Figure 4). Now, the price of a flat rate might either be greater or smaller than this value. Should the flat rate price be greater, decision-makers would perceive the situation as a gain with respect to the (cheaper) pay-per-use cost ($Gain_0$ in Figure 4). If the price of the flat rate was an equivalent amount below the reference point, this difference would be framed as a loss ($Loss_0$), as the flat rate would be less expensive than the pay-per-use tariff. Since the value-function is steeper for losses than for gains, the reflection effect causes that the perceived value of $Gain_0$ is smaller than the perceived value of the equivalent $Loss_0$ ($g_0<l_0$). So, the potential loss when choosing the pay-per-use tariff overweighs the potential gain. Therefore, if expectations about costs are determined on the basis of a pay-per-use model (expected usage), a preference for a flat rate might emerge.

Option 2: On the other hand, a known price of a flat rate might as well determine the reference point of decision makers (R_1 in Figure 4) (Lambrecht and Skiera, 2006). If the cost for actual or expected

usage based on a pay-per-use tariff was greater than the flat rate price, decision makers would perceive this fact as a gain ($Gain_1$). However, should the price for actual or expected usage (in a pay-per-use tariff) be an equivalent amount below that flat rate price, they felt a loss ($Loss_1$). Again, the perceived value of the gain is smaller than the perceived value of an equivalent loss ($g_1<l_1$). So, loss-averse decision makers might tend to choose a pay-per-use tariff when using a flat rate tariff as a reference point.

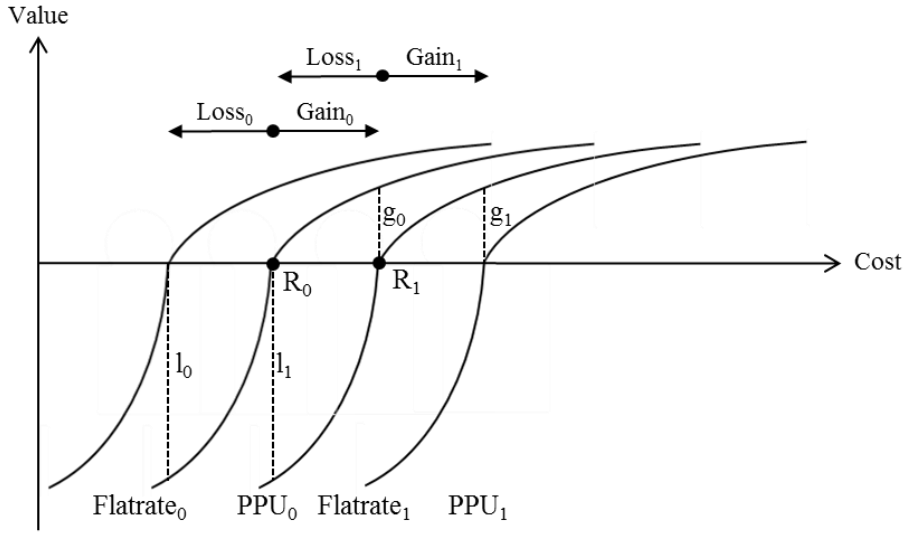

Figure 4. Exemplary value functions for flat rate and pay-per-use reference points

Furthermore, the certainty effect implying that individuals overweight certain outcomes (Kahneman and Tversky, 1979) might also play a role here, depending on which conditions are considered certain or uncertain. As we can see from Table 3, the interviewees that indicated a preference for a flat rate considered a scenario with increasing usage more probable than usage decreases. Vice versa, in the GAMMA case, a loss scenario with decreasing consumption was considered more probable. Therefore, the directionality of the uncertainty about future consumption seems to play an important role here. This directionality also "turns" the effect of risk aversion toward choosing flat rate or pay-per-use tariffs.

The nature of our qualitative approach and the insights we gained from our cases do now allow us to assess these relations on a large-scale basis. Therefore, we cannot definitely assume that the described interrelationships between the nature of reference points, consumption uncertainty and tariff preferences are real. However, the results we obtained do support the model. Whenever the flat rate bias occurred and the insurance effect was present, our interviewees compared prices based on pay-per-use tariffs and expected increasing usage, which is exemplified by the two quotes in section 4.2.1. In the GAMMA case however, where we found a pay-per-use bias to be present, the underlying assumption of our interviewees (although not stated explicitly) seems to be that a flat rate tariff would be worse, given the expected decrease in usage. Hence, the flat rate tariff might have been their reference point.

Another interesting insight from our study is that we find evidence for the convenience effect resulting in a flat rate bias. Previous results (Backhaus et al., 2011) suggest that this effect should not be relevant in B2B-settings. Yet, in our interviews, we found that decision makers in large organizational settings are aware that calculating costs based on pay-per-use tariffs requires a lot more effort than choosing a flat rate tariff. Hence, the convenience of this simple tariff-choice might also significantly influence tariff-choice decisions.

6 Conclusion

In our study, we have analysed tariff-choice preferences in large organizational settings. Our findings support the existence of tariff-choice biases in the business-to-business context. The results of our multiple case study shed light on the presence of the insurance and convenience effects as causes for the flat rate bias, and we were able to present evidence for the insurance effect leading to a pay-per-use bias.

Our study does also have some limitations. Case study research is always limited in generalizability, our research even more so. Although the existence of tariff-choice biases was one of the aspects we originally planned to analyse, it was not the focal point of data collection. Therefore, our main findings are based on only six interviews. Still, these six interviews and the coherent data from the questionnaire allow drawing initial conclusions on tariff-choice biases in the context of software acquisition. Moreover, our findings are based on qualitative data. We were not able to obtain accurate data about the costs of the purchased software solutions with respect to alternative tariff choices. However, this is mainly because the purchasing organizations did not know about the costs for alternative tariffs in detail, either. Hence, we assume that tariff preferences are a good indicator of the existence of tariff biases. Also, we cannot be sure that the effects we found to be irrelevant across our five cases need to be irrelevant. Similarly, not all the effects and causes we encountered need to be present in this combination. Yet, we have shown the general existence of these effects and believe that they can be of high relevance for tariff-choice decisions in similar settings that extend software acquisition cases. In conclusion, while our findings are not statistically generalizable to all large organizations, our case study presents effects and mechanisms that exist and that seem to be relevant in different contexts. These causes and effects can and should be further evaluated and validated in quantitative studies.

Still, this paper offers a number of theoretical contributions. We have shown that tariff-choice biases are present in large-scale organizational decision making situations, which has not been discussed in research so far. Additionally, we were able to present evidence for the convenience effect as a trigger for the flat rate bias in organizational settings – opposed to the expected irrelevance in literature. Most importantly, we believe to offer new insights into the role of the insurance effect as a cause for flat rate and pay-per-use bias, respectively. Our theoretical explanation based on prospect theory brings together so far disparate streams of research and offers a starting point for future work. We find that the reference point in combination with the expectation of decreasing or increasing usage are significant predictors of tariff-choice preferences. These findings extend the current body of knowledge on tariff-choice biases and are especially relevant for organizational settings.

Our study is also of relevance for practitioners. Since flat rate biases occur in organizational decision making and not only in (near-) consumer decisions, tariff choices should be made carefully. Decision makers should analyse all of their options and especially take into account which reference model they base their calculations upon. Well-trained decision makers who know about potential biases are needed, as making conscious decisions based on all available data is crucial to come to optimal tariff choices.

As for future research opportunities, we see several options to consider for future work: First, we encourage researchers to take into account both the flat rate and pay-per-use bias when studying tariff-choice decisions in organizations. Second, while our results have presented initial insights, we call for more research analysing these biases in organizational contexts. Studying other types of buying situations and applying quantitative or experimental methodologies seems to be promising. Third, looking into group-decision phenomena and the impact of social interaction on tariff-choice preferences promises novel insights in organizational settings. Fourth, it might be fruitful to analyse tariff choices based on objective data, i.e., detailed costs and different pricing metrics. We believe this field of research has been underestimated so far and still offers promising research opportunities.

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